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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,843	03/16/2004	Michael Francis Xavier Gigliotti JR.	130445-1	3108

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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EXAMINER	
AUSTIN, AARON	

ART UNIT	PAPER NUMBER
1775	

DATE MAILED: 12/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/801,843	GIGLIOTTI ET AL.	
	Examiner	Art Unit	
	Aaron S. Austin	1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20,22-76 and 79-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *81* is/are allowed.

6)☒ Claim(s) *20,22-76,79 and 80* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20, 23-30, and 80 are rejected under 35 U.S.C. 102(b) as being anticipated by Gessinger et al. (US Patent No. 4,380,574).

Gessinger et al. teach a high-damping composite material consisting of a metal or metal alloy base, such as a steels, super alloy, titanium alloy, etc. (column 2, lines 62-66), which determines the strength and shape of the material and a metal or metal alloy surface layer, such as a memory alloy (column 3, lines 5-24) of which NiTi is an example (column 4, line 63), surrounding the base material. The surface layer may be applied by electrolytic or other means, such as plasma spraying and dense-sintering (column 4, lines 34-48). A diffusion barrier layer may be used between the base and the surface layer (column 4, lines 48-55). The surface layer material undergoes an austenite-martenistic phase transition (column 4, lines 58-61).

Regarding claim 80, Gessinger teaches NiTi type memory alloys which may contain additional alloying elements (column 3, lines 20-24).

Claims 20, 22-35 and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches a titanium alloy article, such as a turbine blade, comprising a protective coating of austenitic stainless steel over the blade and an oxide layer over the protective coating (abstract). The coating has greater toughness and ductility and improved ductile to brittle transition temperatures as well as reduced diffusion rates (paragraph [0034]). An intermediate (barrier) layer is used to further inhibit diffusion between the turbine blade substrate and the outer protective coating wherein the intermediate layer can be selected from a wide variety of metals (including niobium), nitrides, and oxygen-containing compounds such as silica (line 56 in column 4 to line 11 in column 5). The protective coating maybe applied by any of a number of methods including plasma spraying, cladding (extruding), hot isostatic pressing, electroplating, and chemical vapor deposition (paragraph [0036]). The coating may further comprise hard particles in the form of nitrides (paragraph [0046]). Alternating layers of the protective layer and titanium may be used (paragraph [0045]) along with the oxide/nitride containing layers (paragraph [0046]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gessinger et al. (US Patent No. 4,380,574) in view of European Patent Application No. 1,054,077 A2 (EP '077).

Gessinger et al. teach a high-damping composite material as described above, but do not teach the composition of the diffusion barrier layer.

EP '077 teaches an intermediate (barrier) layer used to further inhibit diffusion between a turbine blade substrate and a outer protective coating wherein the intermediate layer can be selected from a wide variety of metals (including niobium), nitrides, and oxygen-containing compounds such as silica (line 56 in column 4 to line 11 in column 5). Therefore, as EP'077 clearly teaches a diffusion layer comprising elements as claimed provides the advantage of inhibiting diffusion between an alloy and a protective layer, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the diffusion layer taught by EP'077 as the diffusion layer taught by Gessinger et al. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that discovering an optimum value of

a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 37-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077) in view of WIPO international patent application WO 99/66102 (WO '102).

EP '077 teaches a titanium alloy article as described above, including the use of hot isostatic pressing (paragraph [0036]).

EP '077 does not teach the claimed process parameters.

WO'102 teaches the usage of nickel-titanium intermetallic compounds as coatings on austenitic steel substrates and processes for their production including hot isostatic pressing (page 2, lines 24-28). The pressure, temperature, and timing of the process overlap the claims (page 3, lines 29-34 and claim 10). Heat treatment and aging are both used (claims 4 and 11). Therefore, as WO'102 clearly teaches the claimed process parameters provide the advantage of forming a plating of memory material on geometrically complex and even large surfaces (page 2, lines 18-19), it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use hot isostatic pressing to form the claimed alloy article as described by EP '077 using the process parameters disclosed by WO'102. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Regarding claim 50, EP '077 teaches a titanium aluminide turbine blade as described above, but does not specify the size of the grains (nitride particles) used.

However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 52-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077) in view of WIPO international patent application WO 99/66102 (WO '102).

EP '077 teaches a titanium alloy article as described above, including the use of cladding (extruding) (paragraph [0036]).

EP '077 does not teach the claimed process parameters.

WO '102 teaches the usage of nickel-titanium intermetallic compounds as coatings on austenitic steel substrates and processes for their production including hot isostatic pressing as described above (page 2, lines 24-28). Both co-extrusion and hot isostatic pressing are pressure dependent processes that apply pressure over time and at various temperatures to produce a product. Therefore, as there is a direct relationship between the two processes, it would have been obvious to one of ordinary skill in the art to apply the parameters taught by WO '102 in the cladding process taught by EP '077.

Further, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the process parameters for the intended application, since

it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 66, EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 52 and 53, EP '077 teaches a titanium alloy article as described above, but does not specify the area reduction ratio. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the area reduction ratio for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 68-76 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application No. 1,054,077 A2 (EP '077).

EP '077 teaches titanium alloy article as described above, but does not specify the size and shape of the titanium alloy article. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the size and shape of the titanium alloy article for the intended application, since it has been held

that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 76, EP '077 teaches a titanium alloy article as described above, but does not specify the size of the grains (nitride particles) used. However, it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the particle size for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 80 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gessinger et al: (US Patent No. 4,380,574) in view of Gowda et al. (US Patent No. 7,093,423).

Gessinger et al. teach a high-damping composite material as described above, but do not specifically teach the NiTi type memory alloy as comprising one of NiTiCr and NiTiFe.

Gowda et al. teach NiTiFe as an alloy suitable for use in turbine engine components. Therefore, as Gowda et al. clearly teach a NiTiFe is a memory alloy suitable for use in turbine engine components, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the NiTiFe memory alloy of Gowda et al. as the NiTi type alloy taught by Gessinger et al. Thus the claimed invention as a whole is *prima facie* obvious over the combined teachings of the prior art.

Allowable Subject Matter

Claim 81 is allowed.

Response to Arguments

Applicant's arguments, see the Remarks, filed September 13, 2006, with respect to the objection to claim 52 and the rejection of claims 19-76 and 78-79 over WO102 in view of EP077 have been fully considered and are persuasive in light of the present amendments. The objection and rejection on these bases has been withdrawn.

Applicant's arguments filed September 13, 2006 have been fully considered but they are not persuasive.

In particular, Applicant argues Gessinger provides no description of the properties of the diffusion layer claimed. Applicant provides a description of the claimed properties of pure metals or alloys that do not form brittle and/or low melting phases due to interaction with the erosion resistant protective structure or substrate at paragraph [0039] of the specification. Exemplary but non limiting examples are given as being Nb, Hf, Ta, and Zr. As the properties are not further defined, they must be interpreted as provided by the Applicant. As all solid metals have some level of brittleness due to hardness and as the term "low melting phase" is undefined as to what temperatures qualify as low melting, it is the Examiner's position that a diffusion layer as taught by Gessinger will have the claimed properties. This position is supported further with respect to the low melting phase requirement in that the diffusion barrier layer of

Gessinger necessarily has heat resistance in use in thermal machine components and is therefore interpreted as being resistant to low temperature melting.

Further, Applicant argues EP077 discloses potential materials for the diffusion controlling layer that include brittle portions and would not avoid low melting phases as column 5, lines 10-20 and is therefore not within the claimed subject matter. However, Applicant has not provided support for this argument. Furthermore, exemplary but non limiting examples of the claimed pure metals or alloys having these properties are given as being Nb, Hf, Ta, and Zr at paragraph [0039] of the present specification. As EP077 specifically teaches niobium barrier layers or alloys thereof as suitable barrier layers, for example, the barrier layer of EP077 meets the limitations of the claim as taught by Applicant.

Moreover, Applicant argues the combination of WO102 and EP077 is improper on an analysis concluding the references teach away from each other. This conclusion is based on the belief that the WO102 reference promotes the importance of a reaction at the boundary layer between the coating and the article while the EP077 reference promotes removal of any reaction at the interface between the materials.

However, the WO102 reference was used to describe the process parameters under which the hot isostatic pressing taught by EP077 could occur. It is the Examiner's position that EP077 does not in fact teach away from a reaction layer formed during hot pressing as described by WO102. EP077 does teach use of layers

similar to those described by WO102, with the primary difference being the existence of a diffusion barrier, all subjected to hot isostatic pressing as described above. The hot isostatic pressing taught by EP077 serves to adhere the layers together and thus serves the same purpose as taught by WO102 (the formation of a reaction layer between the surfaces to "bind the plating to the surface to be plated" - page 4, lines 17-21). While EP077 does teach reduction/prevention of interdiffusion of the layers, it does not teach away from adhesion of the layers in a reaction layer between the materials. In fact, such a reaction layer is essential in the hot isostatic pressing process taught to form their invention. Therefore the prior rejections are maintained.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron S. Austin whose telephone number is (571) 272-8935. The examiner can normally be reached on Monday-Friday: 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASA

JENNIFER MCNEIL
SUPERVISORY PATENT EXAMINER
11/24/06